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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/760,348	01/21/2004	Anand D. Sankruthi	200315686-1	9775

22879 7590 08/10/2006

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EXAMINER

DARE, RYAN A

ART UNIT	PAPER NUMBER
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2186

DATE MAILED: 08/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/760,348	Applicant(s) SANKRUTHI, ANAND D.	
	Examiner Ryan Dare	Art Unit 2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 May 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The amendments to the drawings submitted on 5/24/06 are approved and the corresponding objections are withdrawn

Claim Objections

1. The amendments to the claims overcome the corresponding objections to the claims.

Claim Rejections - 35 USC § 112

1. The amendments to the claims overcome the corresponding 35 USC 112 rejections made in the first Office action.

Claim Rejections - 35 USC § 101

1. The amendments to claim 16 overcome the corresponding 35 USC 101 rejection made in the first Office action. The Examiner now believes this claim is statutory.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-8, 13, and 15-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Kim et al., US PG Pub 2003/0023811, hereafter "Kim".
4. With respect to claim 1, Kim teaches a method of determining volume types present on a storage device, the method including the steps of determining superficial specifying characteristics of a volume on the storage device and correlating the superficial specifying characteristics against one or more previously determined volume characteristics thereby inferring a method used for writing data onto the volume, in figs. 3 and 5. It is disclosed in par. 38 that each disk partition contains a metadata table (which is shown in figs 3 and 6). A metadata table is a superficial specifying characteristic. In fig. 5, the RAID level is specified in numeral 98, which is method of writing to the volume.
5. With respect to claim 2, Kim teaches a method as claimed in claim 1, wherein one of the storage device comprises one or more data storage units, in fig.2 where you can see that each of the disks contain multiple volumes.
6. With respect to claim 3, Kim teaches a method as claimed in claim 2, wherein the one or more data storage units corresponds to a disk or drive and/or is logical or physical, in fig. 2.

7. With respect to claim 4, Kim teaches a method as claimed in claim 3, wherein the storage device comprises a disk, array of disks or similar assembly of partitionable media, in fig. 2.

8. With respect to claim 5, Kim teaches a method as claimed in claim 1, wherein the specifying characteristics include identifying strings embedded in a symbolic name of the volume, in par. 102 and fig. 5.

9. With respect to claim 6, Kim teaches a method as claimed in claim 1, wherein the specifying characteristics further include characteristics related to how the volume is physically arranged in the storage device, in par. 97 and fig. 4.

10. With respect to claim 7, Kim teaches a method as claimed in claim 6, wherein the physical arrangement of the volume on the storage device include criteria corresponding to the size of the storage unit extents of the volume in relation to the actual size of the volume, in par. 102 and fig. 5.

11. With respect claim 8, Kim teaches a method as claimed in claim 1, wherein RAID and striped volume types are identified by corresponding string present in a symbolic volume name, in par. 102 and fig. 5, RAID level 98.

12. With respect to claim 13, Applicant claims a system that corresponds to the method of claim 1, and is therefore rejected using similar logic.

13. With respect to claim 15, Applicant claims a computer adapted to operate in accordance with claim 1, and is therefore rejected using similar logic.

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14. With respect to claim 16, Applicant claims a computer program module embodied on a computer readable medium, adapted to function in accordance with claim 1, and is therefore rejected using similar logic.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

17. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim as applied to claims 1-6, 8, 13, and 15-16 above, further in view of Mason, Jr. et al., US Patent 6,611,896.

18. With respect to claim 9, Kim teaches all other limitations of the parent claim but fails to teach that a mirrored volume type is indicated when the extents of a logical volume are greater than the actual size of the volume. Mason, Jr. et al. teaches that

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when data is mirrored between two physical devices, the extents of the volume will be greater than the actual size of the volume, in col. 4, lines 42-57, thereby teaching:

a method as claimed in claim 1 wherein, if the volume is not previously identified as a RAID volume, the characteristic of the sum of the storage unit extents occupied by the volume being greater than the actual size of the volume corresponds to a mirrored volume type.

19. It would have been obvious to one of ordinary skill in the art at the time the invention was made, having the teachings of Kim and Mason, Jr. et al. before him at the time the invention was made, to modify the logical volume management system of Kim with the logical volume management system of Mason, Jr. et al., in order to identify mirrored volumes, thereby allowing optimization of seek times to mirrored volumes, as taught by Mason, Jr. et al. in col. 3, lines 5-20.

20. Claims 10-12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim as applied to claims 1-8, 13, and 15-16 above, further in view of Cabrera et al., US Patent 6,553,387.

21. With respect to claim 10, Kim teaches all other limitations of the parent claim but fails to expressly teach that a simple volume type corresponds to storage unit extents being on the same storage unit. Cabrera et al. teach a method, wherein the characteristic of the storage unit extents occupied by the volume being on the same storage unit corresponds to a simple volume type, in col. 8, lines 12-14.

22. It would have been obvious to one of ordinary skill in the art, having the teachings of Kim and Cabrera et al. before him at the time the invention was made, to

modify the logical volume management system of Kim with the logical volume management system of Cabrera et al., in order to identify a simple volume, which allows the logical volume manager to determine the sanity of a drive in case of a hardware failure, as taught by Cabrera et al. in col. 3, lines 34-46.

23. With respect to claim 11, Kim teaches all other limitations of the parent claim but fails to expressly teach how storage unit extents correspond to a spanned volume type. Cabrera et al. teaches that a spanned volume type corresponds to the case when the sum of the storage unit extents occupied by a volume are greater than the actual size of the volume and that the storage unit extents occupied by the volume are not on the same storage device, in col. 8, lines 15-21. Note that the concatenation volume type is a synonym for the spanned volume type. Since Kim already taught identification of RAID volume in a previous step, the combination of Kim and Cabrera et al. teaches:

A method as claimed in claim 1, wherein if the volume is not previously identified as a RAID volume, the characteristic of neither the sum of the storage unit extents occupied by the volume being greater than the actual size of the volume nor the storage unit extents occupied by the volume being on the same storage device, corresponds to a spanned volume type.

24. It would have been obvious to one of ordinary skill in the art, having the teachings of Kim and Cabrera et al. before him at the time the invention was made, to modify the logical volume management system of Kim with the logical volume management system of Cabrera et al., in order to identify concatenated (spanned) volume types, which allows the logical volume manager to indicate in the case of a

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physical disk failure, whether the remaining disk is capable of handling I/O, as taught by Cabrera et al. in col. 3, lines 39-46.

25. With respect to claim 12, Kim teaches a method of determining the volume types present on a disk, the method including the steps of:

- determining if a symbolic name of a volume contains information identifying the volume type as either "raid" or "striped" thereby indicating that the volume type is "raid" or "striped" thereby indicating that the volume type is "raid" or "striped" respectively, in figs 2-5, par.102. and as discussed above.

Cabrera et al. teach:

- determining a size of storage unit extents occupied by the volume and the actual size of the volume, in col. 10, lines 13-16;
- determining if the sum of the storage unit extents is greater than the actual size of the volume thereby indicating that the volume type is "mirrored," in col. 8, lines 33-43;
- determining if all of the storage unit extents lie on the same storage unit thereby indicating that the volume type is "simple," in col. 8, lines 12-14;
- and, determining if all the storage unit extents do not lie on the same storage unit and that the sum of the storage unit extents is not greater than the actual size of the volume, thereby indicating that the volume type is "spanned," in col. 8, lines 15-21.

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26. It would have been obvious to one of ordinary skill in the art, having the teachings of Kim and Cabrera et al. before him at the time the invention was made, to modify the logical volume management system of Kim with the logical volume management system of Cabrera et al., in order to identify different types of volumes, which allows the logical volume manager to determine the sanity of a drive in case of a hardware failure, as taught by Cabrera et al. in col. 3, lines 34-46.

27. With respect to claim 14, Kim teaches all other limitations of the parent claim as discussed supra and further teaches a system as claimed in claim 13, wherein the inference step includes extracting the symbolic name of the volume and if it includes the string RAID or striped, correlating that with the RAID and striped volume types respectively, in figs 3-5, par. 102 and as discussed above. Kim fails to teach analyzing the size of the storage unit extents to determine the volume type.

Cabrera et al. teach: otherwise analyzing the size of the storage unit extents occupied by the volume and if the sum of the storage unit extents occupied by the volume and if the sum of the storage unit extents is more than the actual size of the volume correlating that with a mirrored volume type, if the storage unit extents occupied by the volume all reside on the same storage unit, correlating that with a simple volume type and if none of the abovementioned criteria are met, correlating this with a spanned volume type, in col. 10, lines 13-16, col. 8, lines 12-21 and 33-43.

28. It would have been obvious to one of ordinary skill in the art, having the teachings of Kim and Cabrera et al. before him at the time the invention was made, to modify the logical volume management system of Kim with the logical volume

management system of Cabrera et al., in order to identify different types of volumes, which allows the logical volume manager to determine the sanity of a drive in case of a hardware failure, as taught by Cabrera et al. in col. 3, lines 34-46.

Response to Arguments

29. Applicant's arguments with respect to claims 1-16 have been considered but are moot in view of the new ground(s) of rejection, necessitated by amendment.

Conclusion

30. The prior art made of record on form PTO-892 and not relied upon is considered pertinent to applicant's disclosure. Applicant is required under 37 C.F.R. § 1.111(c) to consider these references fully when responding to this action. Specifically, the document disclosed therein, "Software RAID for BSD: Vinum" suggests naming a volume based on the volume type.

31. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

32. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan Dare whose telephone number is (571)272-4069. The examiner can normally be reached on Mon-Fri 9:30-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on (571)272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Ryan A. Dare', with a stylized, cursive script.

Ryan A. Dare
August 4, 2006